10/529021

JC17 Rec'd PCT/PTO 24 MAR 2005

Amendments to the Claims

1. (currently amended): A fibre for thermal bonding comprising a propylene polymer composition (A) having an MFR value from 4 to 50 g/10 min, and being selected from:

   i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:

      a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally at least one of ~~one or more~~ C_4-C_{10} α-olefins and having a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by temperature rising elution fractionation (TREF) with xylene to the xylene soluble fraction, higher than 8; and

      b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally at least one of ~~one or more~~ C_4-C_{10} α-olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and

   ii) a crystalline propylene polymer composition having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight; the ~~said~~ composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) ~~and/or~~ C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

      I) 20-80% of at least one of a crystalline propylene homopolymer and a ~~and/or~~ crystalline propylene random copolymer containing at least one

of (i) up to 1.5% by weight of ethylene and (ii) ~~and/or~~ C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer I) ~~(I)~~ and polymer IIa) ~~(IIa)~~ is ~~be~~ at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned; and

IIb) a copolymer of propylene with 1.5 to 18% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) ~~(I)~~ and polymer IIb) ~~(IIb)~~ is ~~be~~ at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) ~~(IIa)~~ and copolymer IIb). ~~(IIb).~~

2. (currently amended): The fibre of claim 1 wherein the polymer composition ii) ~~(ii)~~ has a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95° C by TREF with xylene to the xylene soluble fraction higher than 8; the said composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) ~~and/or~~ C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

I) 20-80% of at least one of a crystalline propylene homopolymer and a ~~and/or~~ crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) ~~and/or~~ C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 5% by weight of ethylene; provided that the difference in the ethylene content between polymer I) ~~(I)~~ and polymer IIa) ~~(IIa)~~ is ~~be~~ at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned;

IIb) a copolymer of propylene with 1.5 to 12% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) ~~(I)~~ and polymer IIb) ~~(IIb)~~ is ~~be~~

at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) ~~(IIa)~~ and copolymer IIb). ~~(IIb)~~.

3. (currently amended): The fibre of claim 1 ~~claims 1 and 2~~ wherein the polymer composition ~~material~~ has MFR values from 6 to 15 g/10 min.

4. (currently amended): The fibre of claim 1 ~~claims 1 to 3~~ wherein the difference in the ethylene content between polymer I) ~~(I)~~ and polymer IIa) ~~(IIa)~~ is at least 1 percentage unit with respect to the weight of the (co)polymer concerned.

5. (currently amended): The fibre of claim 1 ~~claims 1 4~~ having a value of bonding force at 150° C of at least 300 cN.

6. (currently amended): The fibre of claim 5 obtained ~~claims 5 and 6 obtainable~~ by a spinning process wherein the composition is subjected to an extrusion temperature of at most 275° C ~~or less~~.

7. (currently amended): The fibre of claim 5 having a bonding force value of 300 to 800 cN and an MFR value of 50 g/10 min or less and being obtained ~~obtainable~~ by a spinning process wherein the composition is subjected to an extrusion temperature of at most 275° C ~~or less~~.

8. (currently amended): The fibre of claim 6 ~~claims 6 7~~ wherein the extrusion temperature ranges from 260° to 275° C.

9. (currently amended): A melt spin process for the production of a fibre for thermal bonding comprising ~~the fibres according to claims 1 4 characterised in that it is subjected to the process~~ a propylene polymer composition having an MFR value from 4 to 50 g/10 min and being selected from:

i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:

a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally at least one of ~~one or more~~ C_4-C_{10} α-olefins and having a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the

temperature range from 25° to 95° C by TREF with xylene to the xylene soluble fraction, higher than 8; and

b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally at least one of ~~one or more~~ C_4-C_{10} α-olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and

ii) a crystalline propylene polymer composition having a melting temperature of at least 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 9% by weight; the said composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) ~~and/or~~ C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

I) 20-80% of at least one of a crystalline propylene homopolymer and a ~~and/or~~ crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) ~~and/or~~ C_4-C_{10} α-olefin; and:

II) 20-80%, preferably from 30-70%, of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer I) ~~(I)~~ and polymer IIa) ~~(IIa)~~ is ~~be~~ at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned;

IIb) a copolymer of propylene with 1.5 to 18% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) ~~(I)~~ and polymer IIb) ~~(IIb)~~ is ~~be~~ at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) ~~(IIa)~~ and copolymer IIb. ~~(IIb).~~

10. (currently amended): The process of claim 9 wherein polymer composition ii) ~~(ii)~~ has a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95° C by TREF with xylene to the xylene soluble fraction, higher than 8; the said composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) ~~and/or~~ C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

I) 20-80% of at least one of a crystalline propylene homopolymer and a ~~and/or~~ crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) ~~and/or~~ C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 5% by weight of ethylene; provided that the difference in the ethylene content between polymer I) ~~(I)~~ and polymer IIa) ~~(IIa)~~ is ~~be~~ at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned;

IIb) a copolymer of propylene with 1.5 to 12% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) ~~(I)~~ and polymer IIb) ~~(IIb)~~ is ~~be~~ at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) ~~(IIa)~~ and copolymer IIb). ~~(IIb).~~

11. (currently amended): The process of claim 9 ~~claims 9 and 10~~ wherein the composition is extruded at a temperature of at most 275° C ~~or lower~~.

12. (original): The process of claim 11 wherein the composition is extruded at a temperature ranging from 260° to 275° C.

13. (currently amended): A thermally bonded non-woven fabric comprising ~~the fibres of claims 1-8.~~ fibres comprising a propylene polymer composition (A) having an MFR value from 4 to 50 g/10 min, and being selected from:

i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:

a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally at least one of C_4-C_{10} α-olefins and having a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by temperature rising elution fractionation (TREF) with xylene to the xylene soluble fraction, higher than 8; and

b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally at least one of C_4-C_{10} α-olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and

ii) a crystalline propylene polymer composition having a melting temperature of at least 153° C ~~or higher~~, a content of fraction soluble in xylene at room temperature lower than 10% by weight; the composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

I) 20-80% of at least one of a crystalline propylene homopolymer and a crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer I) and polymer IIa) is at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned; and

IIb) a copolymer of propylene with 1.5 to 18% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) and polymer IIb) is at

least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) and copolymer IIb).

14. (currently amended): A composite non-woven fabric comprising two or more layers wherein at least one layer is made of ~~the~~ thermally bonded non-woven fabric ~~of claim 13.~~ comprising fibres comprising a propylene polymer composition (A) having an MFR value from 4 to 50 g/10 min, and being selected from:

i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:

a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally at least one of C_4-C_{10} α-olefins and having a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by temperature rising elution fractionation (TREF) with xylene to the xylene soluble fraction, higher than 8; and

b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally at least one of C_4-C_{10} α-olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and

ii) a crystalline propylene polymer composition having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight; the composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

I) 20-80% of at least one of a crystalline propylene homopolymer and a crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer I) and polymer IIa) is at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned; and

IIb) a copolymer of propylene with 1.5 to 18% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) and polymer IIb) is at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) and copolymer IIb).

15. (currently amended): A process for the production of non-woven fabric ~~of claim 13,~~ comprising thermalbonding fibres which comprises a propylene polymer composition (A) having an MFR value from 4 to 50 g/10 min, and being selected from:

i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:

a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally at least one of C_4-C_{10} α-olefins and having a melting temperature of at least 155° C, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by temperature rising elution fractionation (TREF) with xylene to the xylene soluble fraction, higher than 8; and

b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally at least one of C_4-C_{10} α-olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and

ii) a crystalline propylene polymer composition having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight; the composition containing at least one of (1) at least 0.64 wt% of ethylene and (2) C_4-C_{10} α-olefin recurring unit and comprising (percent by weight):

I) 20-80% of at least one of a crystalline propylene homopolymer and a crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer selected from:

IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer I) and polymer IIa) is at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned; and

IIb) a copolymer of propylene with 1.5 to 18% by weight of a C_4-C_{10} α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer I) and polymer IIb) is at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and

IIc) a mixture of copolymer IIa) and copolymer IIb). ~~wherein the fibres of claims 1 to 8 are subjected to thermalbonding.~~

16. (currently amended): A crystalline propylene polymer composition having an MFR value from 4 to 50 g/10 and at least one of an ethylene and a ~~and/or~~ C_4-C_{10} α-olefin content of at least 0.64 wt% and comprising (percent by weight):

I) 20-80% of a crystalline propylene homopolymer or crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) ~~and/or~~ C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer of propylene with higher than 5 to 9% by weight of ethylene;

the ~~said~~ composition having a melting temperature of at least 153° C ~~or higher~~ and a content of fraction soluble in xylene at room temperature lower than 9% by weight.

17. (original): The composition of claim 16 having MFR values from 6 to 15 g/10 min.

18. (currently amended): A process for the polymerisation preparing the crystalline propylene polymer composition having an MFR value from 4 to 50 g/10 and at least one of an ethylene and a C_4-C_{10} α-olefin content of at least 0.64 wt% and comprising (percent by weight):

I) 20-80% of a crystalline propylene homopolymer or crystalline propylene random copolymer containing at least one of (i) up to 1.5% by weight of ethylene and (ii) C_4-C_{10} α-olefin; and

II) 20-80% of a crystalline random copolymer of propylene with higher than 5 to 9% by weight of ethylene;

the composition having a melting temperature of 153° C or higher and a content of fraction soluble in xylene at room temperature lower than 9% by weight; the process being

~~of claims 16 and 17~~ carried out in at least two separate subsequent stages, wherein in at least two polymerisation stages the relevant monomers are polymerised to form polymer I) ~~(I)~~ and in the other stage(s) the relevant monomers are polymerised to form polymer II), ~~(II),~~ operating in each stage, except the first step, in the presence of the polymer formed and the catalyst used in the preceding stage.

19. (new): The fibre of claim 7 wherein the extrusion temperature ranges from 260° to 275° C.